PRESENT NOISE LEVELS

in the

DORCHESTER BAY AREA

Progress Report 1

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ABSTRACT: A progress report on a noise survey and predictions for the Dorchester Bay Area, including an explanation of the noise pollution problem, a set of composite noise rating contours for 1968 and a survey of work in progress.

1. INTRODUCTION

Because of the proximity of Logan Airport to the developing area in and around Dorchester Bay, a noise "survey" based on traffic predictions was undertaken.

In keeping with the emphasis on communications in the New Town project, an explanation of the noise pollution problem shall form the first part of this report. The Bolt, Beranek and Newman methodology used will then be reviewed and the results displayed. Concluding this first progress report will be some comments on noise predictions presently being made.

2. NOISE

2.1 Science and Art

The procedures of predicting noise problems are still extremely primitive. A number of variables have yet to be fully defined such that they can be included in a precise process.

1. Flight paths-tend to vary slightly
2. Varying aircraft-no methodology takes into account the exact noise generation patterns of different aircraft
3. Weather-causes changes in sound transmission
4. Topography-causes changes in sound transmission
5. Large structures-cause changes in sound tranmission
6. Effectiveness of various acoustic measures-can only be estimated.
7. Community makeup-effects of noise on different age groups, sexes, occupations, etc. still unknown
8. Community history-effect of previous noise difficulties still unknown
9. The individual

The question then arises: what do we know? We do have a unit with which to quantitatively represent noise and a

methodology which will predict probable reactions by communities and which can indicate some optimum uses of land exposed to aircraft noise.

2.2 Units

Noise is a subjective sort of thing. Innumerable ways have been invented to describe and quantize it. All units are based on personal reactions in one way or another.

One may estimate community response by making a sequence of calculations involving the perceived noise level, measured on perceived noise decibels (PNdB), and the composite noise rating (CNR).

The perceived noise level for a particular location may be determined by calculations based on the noise contours of the type of aircraft passing over. On the basis of these individual aircraft noise contours and operational information (time of day of measurement, volume of traffic, etc.) one may determine the composite noise rating for the area. From this final figure, the expected community response may be determined.

The composite noise rating zones are delineated as follows:

Zone IV: over 115 CNR
Zone III: 100-115 CNR
Zone II: 90-100 CNR
Zone I: below 90 CNR

A more detailed explanation of the implications of each zone is given in the table.

It is important to remember that these scales are based on a logarithmic measure of sound pressure. Thus, for example, if the "noisiness" from Logan traffic is halved, there will be a decrease of 6 PNdB at any given site plus allowances for atmospheric absorption.

One source[1] states that an increase of four times the number of overflights will result in a 9 PNdB increase; another [2] states that a change on the order of 10 PNdB is necessary to significantly alter people's attitude toward the noise level.

2.3 Methodology

"Land Use Planning with Respect to Aircraft Noise", a 1964 report by the respected firm of Bolt, Beranek, and Newman, furnished the methodology used for the noise ratings.

Aircraft flight statistics were collected from the "Official Airline Guide, Quick Reference North American Edition" (June 1968), airline flight schedules, and from the Federal Aviation Agency personnel at Boston Tower. The data was processed to yield information on the destination, time of flight (day or night), and type of aircraft.

Noise contours for each aircraft type were then consulted, converted into composite noise contours, and overlaid onto an area map to complete the process.

A Bolt, Beranek and Newman table is included with this set of contours to aid in the interpretation of the various composite noise rating zones.

In the examination of the results, a number of things must be kept in mind:

1. The contour lines are not and can not be exact, due to the aforementioned factors of varying aircraft, weather conditions, topography, and flight paths.
2. The interpretation of the zones, while also fairly indicative, is also approximate. Some areas marked Zone III, for instance, may produce only low complaint levels while others may merit quite a few law suits. In the main, however, the results will be as indicated.

Typical aircraft noise zones for some of Boston may be found on the chart.

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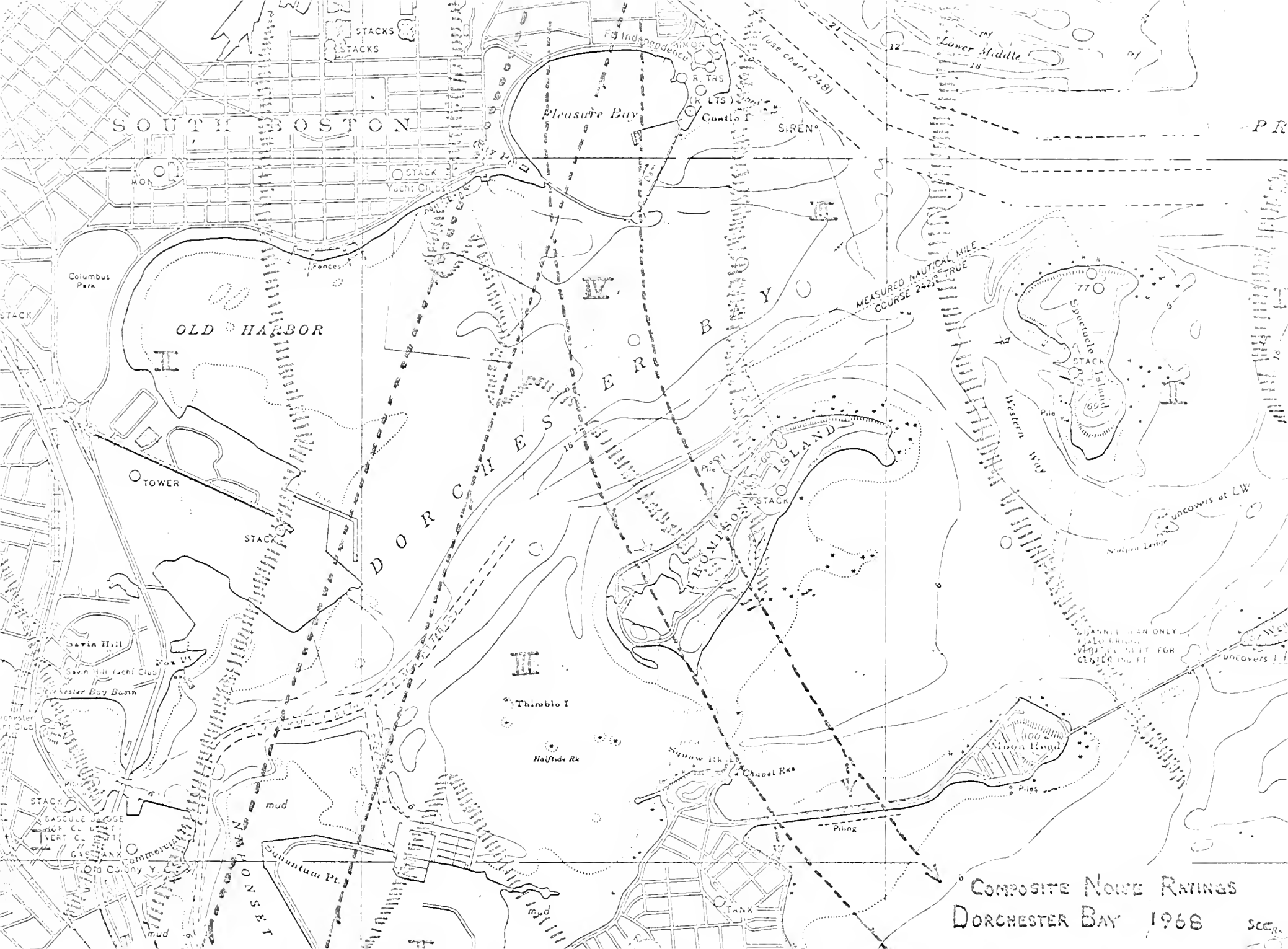
1. "A Summary of Local and National Aircraft Noise Problems", John P. Mathis, private report, July 15, 1967, p. 14.

2. "A Study-Insulating Houses from Aircraft Noise", Bolt, Beranek and Newman, Los Angeles, California, Nov. 1966, U.S. Govt. Printing Office, Washington, D.C., p. 4.


SOUTH BOSTON
Pleasure Bay
Castle I
SIREN
Fd Independence
R. TRS
(R. LTS)
STACKS
STACK
Yacht Club
MON
Columbus Park
Fences
OLD HARBOR
TOWER
STACK
DORCHESTER BAY
MEASURED NAUTICAL MILE
COURSE 242.3° TRUE
Spectacle Island
77
69
STACK
Pile
Western Way
THOMPSON ISLAND
STACK
Pile
Sculpin Ledge
Uncovers at LW
Davis Hill
Davis Hill Yacht Club
Dorchester Bay Bunn
Thimble I
Halfside Rk
Squaw Rk
Chapel Rks
Green Rock
Piles
Piling
mud
STACK
BASCULE BRIDGE
OVER CHANNEL
VERT CLEARANCE
GAS TANK
Commercial Pt
Old Colony Y
Squantum Pt
NEPONSET
mud
mud
TANK
Lower Middle
12
18
21
(use chart 248)
PR
I
II
III
IV
V
COMPOSITE NOISE RATINGS
DORCHESTER BAY 1968

LAND USE COMPATIBILITY CHART FOR AIRCRAFT NOISE

Noise Sensitivity Zone	Composite Noise Rating (CNR) Takeoffs & Landings	Residential	Commerical	Hotel, Motel	Offices, Public Buildings	Schools, Hospitals, Churches	Theatres, Auditoriums	Outdoor Amphi-Theaters, Theaters	Outdoor Recreational (Non-Spectator)	Industrial
I	Less than 90	yes	yes	yes	yes	yes	Note (A)	Note (A)	yes	yes
II	90-100	yes	yes	yes	yes	Note (C)	Note (C)	no	yes	yes
III	100-115	Note (B)	yes	Note (C)	Note (C)	no	no	no	yes	yes
IV	Greater than 115	no	Note (C)	no	no	no	no	no	yes	Note (C)

Note (A) - A detailed noise analysis by qualified personnel should be undertaken for all indoor or outdoor music auditoriums and all outdoor theaters.

(B) - Case history experience indicates that individuals in private residences may complain, perhaps vigorously. Concerted group action is possible. New single dwelling construction should generally be avoided. For high density dwellings (apartments) construction, Note (C) will apply.

(C) - Avoid construction unless a detailed analysis of noise reduction requirements is made and needed noise control features are including in building design.

Reference: Analysis of Community and Airport Relationships/Noise Abatement, Bolt, Beranek, December 1965, AD 645 955.

2.4 Remarks on Future Work

Predictions of 1975 and 1985 noise levels are already under way. Some generalizations may be made at this time:

1. The engineer's research and conversations with FAA personnel and several ranking faculty members of MIT's Aeronautical and Astronautical Engineering Department up to this time have yielded no indications that aircraft will be substantially quieter in two decades. It seems that only unforeseen engineering breakthroughs will make such a state possible.
2. Research and conversations up to this time indicate that the conversion of Logan Airport to other uses seems unlikely. Logan will probably remain a major airport for the Boston area through the foreseeable future.
3. Research and conversations up to this time indicate that the construction of a new airport on or near the Brewster Islands in Boston Harbor is also unlikely due due to technical problems with such factors as flight paths and weather damage from sea, spray and frost.

Noise predictions will be made for a number of alternative futures. Contemplated are:

1. Logan Airport filled to capacity with long and short range traffic.
2. Logan Airport handling all or mostly long range (greater than 500 mile radius) traffic.
3. Logan Airport handling long range traffic plus short range vertical/short takeoff and landing (V/STOL) aircraft.
4. Logan Airport handling all or mostly long range traffic with V/STOLs flying from some other site in or near Dorchester Bay.

In addition, the engineer will attempt to predict possible diversion of flight paths by a new airport to the west. Not much hope is held out for this particular effort, however, unless the Port Authority releases its newest study which will probably contain the location of the site for a new airport.